From the Desk of the Editor

Cutting cost without compromising quality: Can we deliver ICU care to our poor?

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Critical care is simply health care for very sick patients. As such critical care in resource poor settings must meet all challenges of general health care in these settings. These challenges are lack of drugs, equipments, supporting infra structure and trained personnel[1].

ICU patients are complex, with multiple concurrent problems and interventions. Most ICU therapies are only supportive and therefore may not individually result in improved outcome. Accurate cost data are not commonly available and are also difficult to obtain.

Critical care faces a challenge in that it is deemed too costly or complicated for resource poor settings. However some of the effective critical care interventions, including rapid fluid resuscitation, early initiating antibiotics and patient monitoring are relatively inexpensive. Caring for critically ill patients is over all expensive. Although the critically ill patients represent a relatively small fraction of hospital volume, the cost burden incurred is disproportionately large[2].

The economic burden resulting from ICU admission in hospital consumes a major portion of resources allocated for health-care services. Cost-effectiveness of various interventions in ICU and its increasing trend without compromising quality has relatively been well explored in developed countries. There is no data on implementation of such measures in low income countries like Bangladesh. Data on effectiveness of intensive care unit (ICU) interventions are also lacking in our country.

One study[3] has reported that ICU capacity is only 0.3 beds per 100,000 inhabitants in Bangladesh and 2.4 beds per 100,000 inhabitants in Malaysia and 2.5 beds per 100,000 inhabitants in Sri Lanka and 3.9 beds per 100,000 inhabitants in China.

Scarcity of western style emergency services capable of managing critically ill and injured place burden of care of these patients on already overburdened and inadequate number of ICUs of Bangladesh.

According to Worldometers data[4] for Bangladesh in 2017, population of our country was approximately165 million in 2017 and according to World Bank data[5] per capita annual GDP for our country in 2017 was approximately US$ 1600/- (BDT 350/=US $ 05/- per day).

In low and /or middle income (LMIC) countries where social security networks are usually lacking, the loss of an individual's economic activity has far more extensive economic consequences for families involved. Ideally region specific currency conversions /purchase power parity comparisons should be made[6].

The World Health Organization uses a cut off of less than one times GDP per capita for "very cost effective" interventions, between one and three times GDP per capita for cost effective interventions and more than three times GDP per capita for interventions that are not cost effective[7].Cost effectiveness studies on more complex critical care interventions in resource poor settings have not been done. But studies for surgical services suggest that even resource-intensive interventions may in fact compare favorably to prevention and primary care. One study from Bangladesh[8] showed cost of US $10.93 (Taka 874/-) per disability life year (DALY) from surgical services including emergency obstetrical care. This compared favorably with cost of US $30/-for measles immunization, US $20/- for acute lower respiratory tract infection and treatment.

According to unofficial source ICU care provided by few Govt. Medical College hospitals in Bangladesh are theoretically free of charge. But quality of care is some what compromised because of paucity of supplies[9]. Because of limited ICU beds in Govt. Medical College hospitals, patients(only poor patients seek care in Govt. hospitals) are turned down for admission into ICU. In BSM Medical University (BSMMU) at Dhaka, the prime university hospital of our country, ICU care is not free but subsidized. Here cost of ICU stay usually runsbetween BDT 5000/-and 15000/- ($ 60/- $180/-) per day. In mid size privately run hospital (total hospital bed ranging between 50 and 200) and nonprofit private hospital like BIRDEM General Hospital and in a private medical college hospitals, daily ICU care may cost ranging between BDT 30,000/-and 40,000/- ($360/- and $400/-) . In large private hospital (total hospital bed exceeding 250 beds) cost of ICU care may go up to BDT 70000/- ($ 900/-) per day or more. As such considering per capita income of our population, affording ICU care is a dream for majority of Bangladeshi population who are financially constrained.

In one of the few costing analysis of an ICU from a lower income countries like India the total cost per ICU admission day was estimated to be just over US $ 200/- which is between approximately 5 and 20% of that for high income countries [10].

Critical care has often been deemed in appropriate or at least of lower priority than prevention and primary care. Intensive care is not defined by expensive technology. If critical care encompasses all aspects of critically ill patients, it may include oxygen administration or frequent nurse monitoring. Although these interventions may not be considered critical care in resource rich settings, they are nonetheless important aspects of caring for critically ill patients and are not universally available. Poor prioritization of critical care is based on assumption that its relative cost is too high, when compared with other interventions. Much of the critical care involves relatively in expensive training in how to recognize,

respond to and monitor critical illness. Simple interventions that are known to be effective such as early resuscitation with fluids and antibiotics in septic shock can be achieved by increasing the number of trained staff[11].

Slowing the rise in costs while maintaining or improving quality of care is challenging, because attempts to control expenditures risk curtailing necessary, as well as unnecessary, services. Meeting this challenge requires strategies that address both cost and quality. Initiatives, aimed solely at cost-cutting risk harming patients by eliminating necessary and appropriate care, and efforts to improve the quality of care need to consider the accompanying costs. Profiling and practice guidelines are tools that can be used in conjunction with economic incentives to help practitioners, patients, and payers reduce the rate of increase in costs while not sacrificing quality. We then discuss the roles that profiling and practice guidelines can play in this effort, including the infrastructure and incentives that can make them more effective in improving practice. Two types of studies suggest that curtailing the increases in volume and intensity of services without compromising the quality of care should be possible. The first type, small-area analyses, has identified large variations in the utilization of health services among similar populations of patients. The second, appropriateness studies, which assess whether services are indicated for specific clinical presentations, have identified substantial amounts of unnecessary care. Too often, policies have been instituted to slow rising costs that do not give due consideration to the impact of the policies on the quality of care. Cost containment that is blind to quality is a risk to the health of the public. But, we can no longer afford continued increases in the volume of care without ensuring its effectiveness. The only rational course is to consider cost and quality together[12].

The development of critical care in resource poor settings will rely on the stepwise introduction of service improvements, leveraging human resources through training, a focus on sustainable technology, ongoing analysis of cost effectiveness, and the sharing of context-specific best practices.[11]

The essential considerations for ICUs in resource poor settings can be divided into four different areas namely personnel and training, equipment & support services, ethics and research[11]. Means like following sepsis check list, ICU bundles proposed by Institute of Health Care Improvements[13], creating training modules that require less personal treating time are measures to promote personnel and training. Recognizing that non invasive monitoring can be adequate, keeping manual devices at each bed side in case of equipment malfunction or power loss, instead of costly piped oxygen keeping oxygen cylinders, focusing on effective model of ventilator etc are measures to make equipment and support services more cost effective.

Geiling et al[14] outlined the following recommendations for critical care in resource poor setting which are defined by the provision of care for life threatening illness without regard to the location including the pre hospital, emergency, hospital wards and intensive care settings. They are : (a) Development of single triage tools, protocol ,and care guidelines modified to resource limitations that can be used by health workers with limited clinical back grounds .(b) critical care providers use protocols to combine workable approaches that are cost effective and efficient. (c) In order to provide quality critical care at any capability level, resource limited countries or health care bodies should strengthen their primary care, basic emergency care and public health systems. Emergency care including triage is often one of the weakest parts of the health systems in resource poor settings but if well organized it can be lifesaving and cost effective. (d) Countries that are chronically resource constrained develop a minimal level of critical care to be provided at district or regional hospital facilities.

Many of the basic principles of good critical care are as applicable (or even more so) to resource poor settings, but are not practiced. These include management and organizational aspects, such as regular ward rounds, proper documentation of vital signs, structured hand over to the next shift of doctors and nurses, admission and discharge policies, the use of both short term and long term treatment plans and adherence to strict hygiene rules[15].

The 'Surviving Sepsis Campaign' guidelines[16] have been implemented across the ICUs of high income countries. It has been observed that part of these recommendations can be applied to more resource limited settings at low or no extra cost. These include the use of low tidal volume for mechanical ventilation, prompt start of appropriate empiric antibiotic treatment, restricted use of fluid therapy after initial phase in septic shock and restricted use of sedation. These practices though useful are often not implemented in resource poor settings[17].

Studies have shown that modular training program with a focus on practical bed side teaching aimed at critical care physicians and nurses caused a reduction in length of stay, duration of mechanical ventilation, vaso-active drugs and antibiotic days in resource poor settings like in Bangladesh and India[18].

We need to use what is immediately transferable from developing world including specialized training for critical care professionals and bundles of good ICU practices. We need to let go of developed practices that are currently hindrances including advanced technologies that cannot be readily maintained. We should prioritize development of relevant technology that is affordable and mainatainable[11].

There are ways to reduce costs without compromising quality: identifying and eliminating unnecessary services; choosing the less costly of alternative effective approaches to care. An effective way of controlling ICU costs is closely monitoring which patients are admitted and at what point they are discharged. Laboratory tests represent a source of cost reduction, and physicians must learn to order specific tests and not simply a battery of tests which includes the actual test desired. Only appropriate tests should be done in that case. Improved efficiency of the utilization of resources can easily improve the care of ICU patients. Bulk of cost may incur in the most critical care units is nursing. Diminishing unnecessary activity will both decrease complications and

have salutary effects. Having more time to be with patients and their families will improve the quality of caring. Hospital support services are as important as the equipment that is specific to the ICU. Basic laboratory capability including complete blood counts, electrolytes, and in some cases cultures are critical and will raise the level of care for the entire hospital and can maintain the best quality as well as reduce the cost of care in ICU invariably[12].

The most basic ethical dilemma in critical care in resource poor setting is that of injustice of disparity in the health carein countries like Bangladesh. This injustice requires seeking funds from the rich to provide for the poor. Because of inadequate number of critical care beds in Govt. run hospitals there is an unwritten rationing of ICU beds. Under these circumstances we have to develop policies regarding appropriateness of ICU admissions, cardio pulmonary resuscitations and ventilator candidates. The issue of rapidly growing number of poorly managed privately run ICUs in Bangladesh rendering unethical practice of care has resulted in inappropriately high cost, increased mortality and poor outcome of critically ill patients. Bangladesh Medical and Dental Council and Directorate of Director General of Health, Govt. of Bangladesh can play major role in ensuring operational guidelines for these ICUs[9].

We believe that cutting cost without compromising quality of critical care is a realistic goal in any resource poor country where ICU is an asset and not a financial liability. According to Cubro et al[19], inany resource poor setting, having an ICU is effective and can compete with other health care priorities for resource allocation. Therefore investment in critical care facilities even in resource poor setting can be justified not only by ethical and altruistic reasons but also by very good cost effectiveness.

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References

1 Fowler RA, Adhikari NKJ, Bhagwanjee S. Critical care in the global context- disparities in burden of illness, access, and economics.Crtical Care 2008; 12:225(doi:10.1186/cc6984).

2 Halpern NA, PastoresSM.Critical care medicine in the United States 2000-2005: an analysis of bed numbers, occupancy rates, payer mix, and costs. Crit Care Med 2010; 38(1): 65–71. PMID 19730257.

3 Haniffa R, De Silva AP, Iddagoda S, Batawalage H, De Silva ST, Mahipala PG et al. A cross sectional survey of critical care services in Sri Lanka: A lower middle income country. J Crit Care .29: 764-768.

4 Bangladesh Population (2018) - Worldometers. www.worldometers.info/world-population/bangladesh-population.

5 World Bank national accounts data and OECD National Accounts data files. https://data.worldbank.org/indicator/NY.GDP.PCAP.CD?locations=BD.

6 Schultz MJ, Dunser MW, Dondorp AM, Adhikari NKJ, IyerS,Kwizera A et al. Current challenges in the Management of sepsis in ICUs in resource - poor settings and suggestions for the future. Int Care Med. DOI.1007/s000134-017-4750-z.

7 World Health Organization: CHOosing Intervention that are Cost Effective (WHO-CHOICE), Geneva, Switzerland, World Health Organization 2010.

8 McCard C, Chowdhury Q. A cost effective small hospital in Bangladesh: What it can mean for emergency obstetric care. Int J Gynaecol Obstet.2003; 81: 83-92.

9 Faruq MO. Critical care Medicine in Bangladesh: A national health care challenge (Editorial). Ibrahim Med Col J. 2011; 5(2) i-ii.

10 Kulkarni AP, Divatia JV (2013). A prospective audit of costs of intensive care in cancer patients in India. Indian J Crit Care Med. 2013. 17: 292-297.

11 Riviello ED, Letchford S, Achieng S, Newton MW. Crtical care in resource poor settings: Lessons learned and future directions. Crit Care Med. 2011; 39(4): 860-867.

12 Shapiro DW and Lasker RD, BindmanAB, Lee PR. CONTAINING COSTS WHILE IMPROVING QUALITY OF CARE: The Role of Profiling and Practice Guidelines Annu. Rev. Publ. Health. 1993. 14:219-41.

13 Institute for health improvement: Implement the ventilator bundle.2010. Available at http://www.ihi.org/IHI/Tropics/CriticalCare/Intensivecare/Changes/Implementthe/VentilatorBundle.htm. Accessed April 12 2010.

14 Geiling J, Burkle Jr FM, Amundson D, Dominguez-cherit G, Gomersall CD, Lim ML et al. Resource poor settings : Infrastructure and capacity building. (Care of the critically ill and injured during pandemics and disasters: CHEST consensus statement).CHEST. Aug 2014. DOI: 101378/chest.14-0744.

15 Dondorp A, Haniffa R. Critical care and severe sepsis in resource poor settings. Transaction of Royal Society of Tropical Medicine and Hygiene. Aug 2014; 108(8): 453-454.

16 Levy MM, Dellinger RP, Townsend SR, Linde-Zwirble WT, MarhallJC et al. The surviving sepsis campaign: results of an international guideline based performance improvement program targeting severe sepsis. Int Care Med. 2010; 36: 222-31.

17 Cheng AC, West TE, Limmathurotsakul D, Peacock SJ. Strategies to reduce mortality from bacterial sepsis in adults in developing countries. PLoS Med. 2008; 5.e175.

18 Haniffa R, Lubelle Y, Cooper BS, Mohanty S, Shampul A, Karki A et al. Impact of a structured ICU training programmein resource limited settings in Asia. PLoS One. I: 10.1371/Journal pone 0173483.

19 Cubro H, Somun-Kapetanovic R, Thiery G, Talmor D, Gajic O. Cost effectiveness of intensive care in alow resource setting : A prospective cohort of medically ill patients . World J Crit Care Med. 2016May 4; 5(2): 150-164.